(12) PATENT APPLICATION PUBLICATION GAZETTE (A)

(19) Japanese Patent Office

(11) Patent Publication No.:
10 - 17448
(43) Publication Date: 1/20/1998

(51) Int. Cl.[6]	ID Mark	Int. Process. No.	F I		Tech. Display
A 61 K 7 / 16			A 61 K 7 / 16		
9 / 70	373		9 / 70	373	
31 / 35	ACK		31 / 35	ACK	

Examination Status: Unexamined; Number of Claims: 2 FD (4 Total Pages)

(21) Application No.: 8 - 188459

(22) Application Date: June 28, 1996

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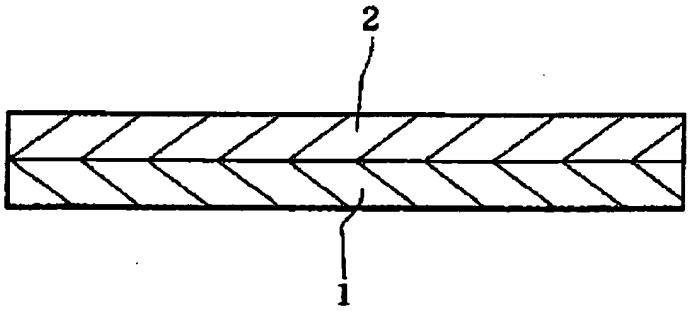
(54) [Title of Invention]
Oral Adhesive Preparation

(57) [Abstract]
[Means of Resolution] An oral adhesive preparation consisting of a teeth whitening agent contained in an adhesive layer that adheres to the surface of the tooth.
[Effect] The oral adhesive preparation of the present invention adheres to the teeth and removes stains caused by coffee, black tea, green tea, other tea tannins, and tobacco.



[Scope of Patent Claims]

[Claim 1] An oral adhesive preparation consisting of a teeth whitening agent contained in an adhesive layer that adheres to the surface of the tooth.

[Claim 2] The oral adhesive preparation set forth in Claim 1 wherein the whitening agent is kojic acid, kojate or a derivative of kojic acid.

[Detailed Explanation of Invention]

[0001]

[Technical Field of Invention] The present invention is related to an oral adhesive preparation that is suitable for whitening teeth. More specifically the present invention is related to an oral adhesive preparation that whitens teeth by removing and preventing adherence of discoloration through the use of a whitening agent that dissolves and bleaches teeth discoloration caused by colored substances that are produced in the consumption of food and drink, smoking, and the like.

[0002]

[Prior Art and Issue Resolved by Invention] In the past, tooth polish and toothbrushes were utilized to remove colored substances that had adhered to the teeth by physically removing the discoloration using the abrasiveness of the polishing agents contained in the polish. However, under these methods it was difficult to completely remove the stains from between the tooth, in the narrow portions where the teeth overlap, and other places that are hard to reach with a brush, or if the operators technique was less than satisfactory. While one may visit the dentist and have this discoloration removed professionally by a dental hygienist or the like, the process requires multiple trips to the dentist every few months or so.

[0003] The present invention is an improvement over the current circumstances, and targets an oral adhesive compound that is capable of removing discoloration simply by being adhered to the teeth.

[0004]

[Means Adopted in Resolution of Issue and Practical Embodiment of Invention] As the result of tireless research to achieve the foregoing goal, the inventors, in the creation of this invention, discovered that by including a teeth whitening agent in an adhesive layer that is adhered or stuck to the teeth it is possible to use that whitening agent to dissolve, bleach and otherwise remove discoloration from teeth as well as prevent the future adherence of said discoloration, and that in such cases kojic acid (kojic acid, kojate, and kojic acid derivatives) is an effective tooth whitening agent, kojic acid produces a strong dissolution and softening effect on tooth discoloration (tea or tobacco stains and the like), and the inclusion of kojic acid in the adhesive layer produces a superior tooth whitening effect.

[0005] Hereunder in the detailed discussion of the present invention the oral adhesive preparation of the present invention will contain the teeth whitening agent in the adhesive layer that adheres to the tooth.

[0006] In this case, the oral adhesive preparation of the present invention will be formed from a support layer 1 and an adhesive layer 2 as illustrated in FIG. 1, and in use it is preferred that the adhesive layer 2 is adhered or stuck to the surface of the tooth, but in no way is the invention limited to this method.

[0007] In this case, the main body of the said support is comprised of an insoluble high polymer which may be formed to also contain a plasticizer. Here the insoluble high

polymer may utilize ethyl cellulose, cellulose acetate, meta acrylic acid, meta acrylate trimethyl ammonium copolymer, polyvinyl acetal, dimethyl amino acetate, dimethyl amino ethyl meta acrylate, meta acrylate copolymer, cellulose acetate, dibutyl hydroxy propyl ethyl, carboxy methyl ethyl cellulose, cellulose acetate phthalate, hydroxy propyl methyl cellulose phthalate or the like, and the plasticizer may utilize ethylene glycol, diethylene glycol, triethylene glycol, propylene glycol, dipropylene glycol, polyethylene glycol, glycerin, triacetylene, castor oil, or the like.

[0008] When forming the foregoing support layer, one may, for example, adopt a method wherein said insoluble high polymer and plasticizer is dissolved in an organic solvent, flattened in a plastic or metal tray or the like, the organic solvent is removed therefrom and the remaining substance is then desiccated.

[0009] The thickness of the support layer is between 50 and 500 μm, and in terms of usability and the like a thickness of between 200 and 300 μm is particularly preferred.

[0010] On the other hand, the preferred core component of the adhesive layer is a water soluble high polymer which may also contain a plasticizing material and whitening ingredient. Here the water soluble high polymer may utilize polyvinyl alcohol, polyvinyl pyrrolidone, carrageenan, locust bean gum, guar gum, hydroxy ethyl cellulose, xanthan gum, tragacanth gum, starch, succino glucan, or the like, and the plasticizing material may be the same as these foregoing substances. The whitening ingredient may be ascorbic acid, iso ascorbic acid, urea hydrogen peroxide, and the like, but kojic acid, sodium of kojic acid, kalium or other alkali metal salts, calcium, magnesium, or other alkaline earth metal salts and other kojic acid, carboxylate ester of kojic acid, ester phosphate and other kojic acid derivatives are particularly suited to the application. In such instances the whitening ingredient should be added at 0.05 to 4% (here and hereinafter % by weight) in the dry adhesive layer, preferably it should be added at 0.1 to 4%, and even more preferably at 0.5 to 2%.

[0011] The method for forming the adhesive layer may be selected accordingly, and a method that dissolves or disperses the foregoing water soluble high polymer, plasticizing material and whitening ingredient in water, then flow casts and desiccates this on said support layer may be adopted, but in such instances a vacuum freeze drying method is preferred since it is desirable that numerous holes are formed in the adhesive layer to allow the kojic acid or other whitening ingredient to effectively work on the surface of the teeth when adhered thereto.

[0012] Moreover, the thickness of the adhesive layer is between 200 and 1000 μm, and in terms of usability and the like a thickness of between 400 and 800 μm is particularly preferred. In addition, the adhesive layer should have a pH of between 4.5 and 9 when wetted in the mouth by saliva or the like, and in particular a range of between 6 and 8 is preferable. If the pH is too low the workability of the material suffers, while an excessively high pH will reduce the effectiveness of the material.

[0013] The oral adhesive material of the present invention may be used, for example, by wetting the adhesive layer in water and adhering and attaching it to the teeth. This would thereby enable the whitening ingredient to work to remove stains on the teeth and whiten teeth.

[0014]
[Effect of Invention] The oral adhesive preparation of the present invention adheres to the teeth and removes stains caused by coffee, black tea, green tea, other tea tannins, and tobacco.
[0015]
[Example Embodiments] Hereunder we shall present example embodiments and comparison examples to more specifically address the present invention. The present invention, however, is in no way limited to these embodiments. Moreover, in the following examples, the various oral adhesive preparations were prepared by flattening the support layer solution in a plastic tray and subjecting it to vacuum desiccation to form the support layer at a thickness of 250 μm, and then flattening the adhesive layer solution thereon and subjecting it to pre-freezing and the freeze drying to form the adhesive layer at a thickness of 700 μm. In addition, the percentages noted hereunder are all percentages by weight.
[0016] (Example Embodiment 1)

1) Adhesive layer	
Polyvinyl alcohol	10.0 (%)
Propylene glycol	3.1
Kojic acid	0.5
Methyl para hydroxy benzoate	trace
Water	86.6
2) Support layer	
Ethyl cellulose	10.0
Castor oil	6.0
Food dye	4.0
Ethanol	80.0

[0017] (Example Embodiment 2)

1) Adhesive layer	
Hydroxy ethyl cellulose	10.0 (%)
Polyethylene glycol	3.1
Kojic acid	1.0
Methyl para hydroxy benzoate	trace
Water	86.6
2) Support layer	
Polyvinyl acetal / dimethyl amino acetate	10.0
Castor oil	6.0
Food dye	4.0
Ethanol	80.0

[0018] (Example Embodiment 3)

1) Adhesive layer	
Hydroxy propyl cellulose	10.0 (%)
Glycerin	3.1
Kojic acid	0.1
Methyl para hydroxy benzoate	trace
Water	86.6

2) Support layer

Ethyl cellulose	10.0
Castor oil	6.0
Food dye	4.0
Ethanol	80.0

[0019] (Comparison Example 1)

1) Adhesive layer

Polyvinyl alcohol	10.0 (%)
Propylene glycol	3.1
Methyl para hydroxy benzoate	trace
Water	86.9

2) Support layer

Ethyl cellulose	10.0
Castor oil	6.0
Food dye	4.0
Ethanol	80.0

[0020] Next, the foregoing oral adhesive preparations were evaluated under the following method using tannin stain chips.

(1) Preparation of tannin stain chips

Sandblasted white acrylic chips (color difference E1) were submerged in the following order for one hour each in the following solutions: 0.5% albumin solution → 3% green tea + 1% coffee + 1% black tea extract solution → 0.57% iron ammonium citrate solution. This process was continued for two weeks. The acrylic chips were removed from the staining solutions, lightly brushed in running water to remove the weaker stains, and then air dried to produce the sample chips.

(2) Method for evaluating tannin removal effect

We measured the color difference (E2) of tannin stained sample chips, and then measured the color difference (E3) of these chips again after the adhesive layers of the foregoing adhesive preparations were soaked in distilled water, applied to the surface of the chips, and set aside for one hour in an atmosphere of 100% humidity.

[0021] The rate of removal was then calculated using the following formula, and the removal effect was evaluated based on the following standards. The results are shown in Table 1.

Rate of removal (%) = [(E3 - E2) / (E1 - E2)] X 100

(Provided, however, that E1 represents the color difference of the chip prior to tannin staining.)

Tannin Stain Removal Power	91% or higher:	○
	70 ~ 90 %:	△
	69% or lower:	×

[0022]
[Table 1]

		Results of Evaluation
Example Embodiments	1	○
	2	○
	3	△
Comparison	1	×

[Brief Description of Drawings]
[FIG. 1] Cross sectional view of one example embodiment of the present invention.
[Explanation of Markings]
1 Support Layer
2 Adhesive Layer

[FIG. 1]